Research Proposal

Detention Pond Performance and Orifice Size

Problem Title. Can very small orifice sizes impede the modeled performance of wet detention ponds because of clogging by floating debris?

Problem Statement. Recently mandated flow/duration control pond designs in the *Stormwater Management Manual for Western Washington* using the *Western Washington Hydrology Model*, and replicated in the *HSPF*-based continuous model *MGSFlood* tends to yield very small 2 year orifice sizes, many times less than 1 inch. When orifices are so small, there is a risk of clogging by common neutral buoyancy objects that can be entrained in stormwater, such as packing peanuts, cigarette butts, and leaves. Maintenance staff have claimed that buoyant objects smaller than the diameter of a soda can (~2.5 inch) will clog a small outlet orifice. If orifices clog on a regular basis, this disrupts the modeled stage/discharge response of the pond and may result in frequent bypasses through the 10-year design orifice.

An associated question that could be addressed in this proposal:

> Are there alternative orifice shapes (e.g. slots, "star" configurations, etc.) other than circular that can reduce clogging. Would installation of small "grit screens" around flow control stacks prevent orifice clogging?

Literature Search. No relevant literature has been identified.

Research Methods. Whenever wet pond monitoring is conducted, perform visual inspections to verify whether clogging by debris is a persistent problem. Query maintenance districts to determine the degree of the problem.

Partnering Opportunities. None.

Estimate of Costs and Research Duration. Because observations can be made during routine maintenance activities, cost would be low (less than $50,000).

Urgency, Payoff Potential, and Implementation. Research could provide design changes to be incorporated into the *HRM*.

Research Proposer

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Research Monitor (to be assigned, as needed, by the research program administrator)

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